

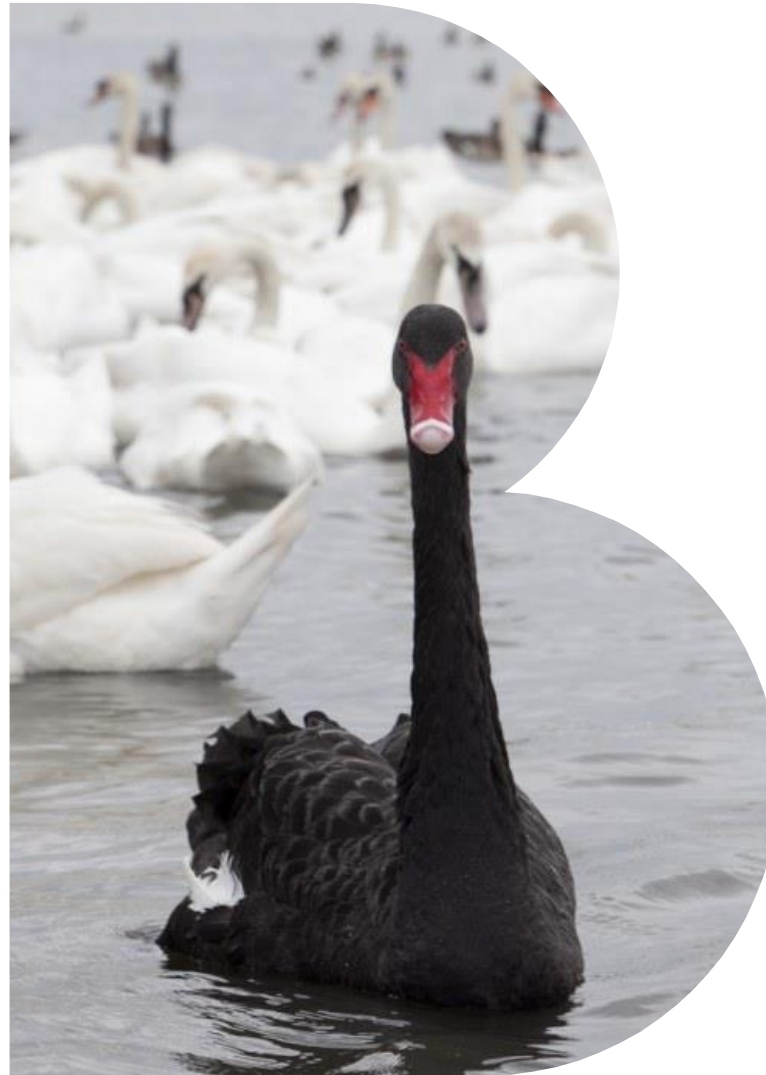
From ADAS to Automated Driving

Changes in business models
and long-term implications on
mobility concepts

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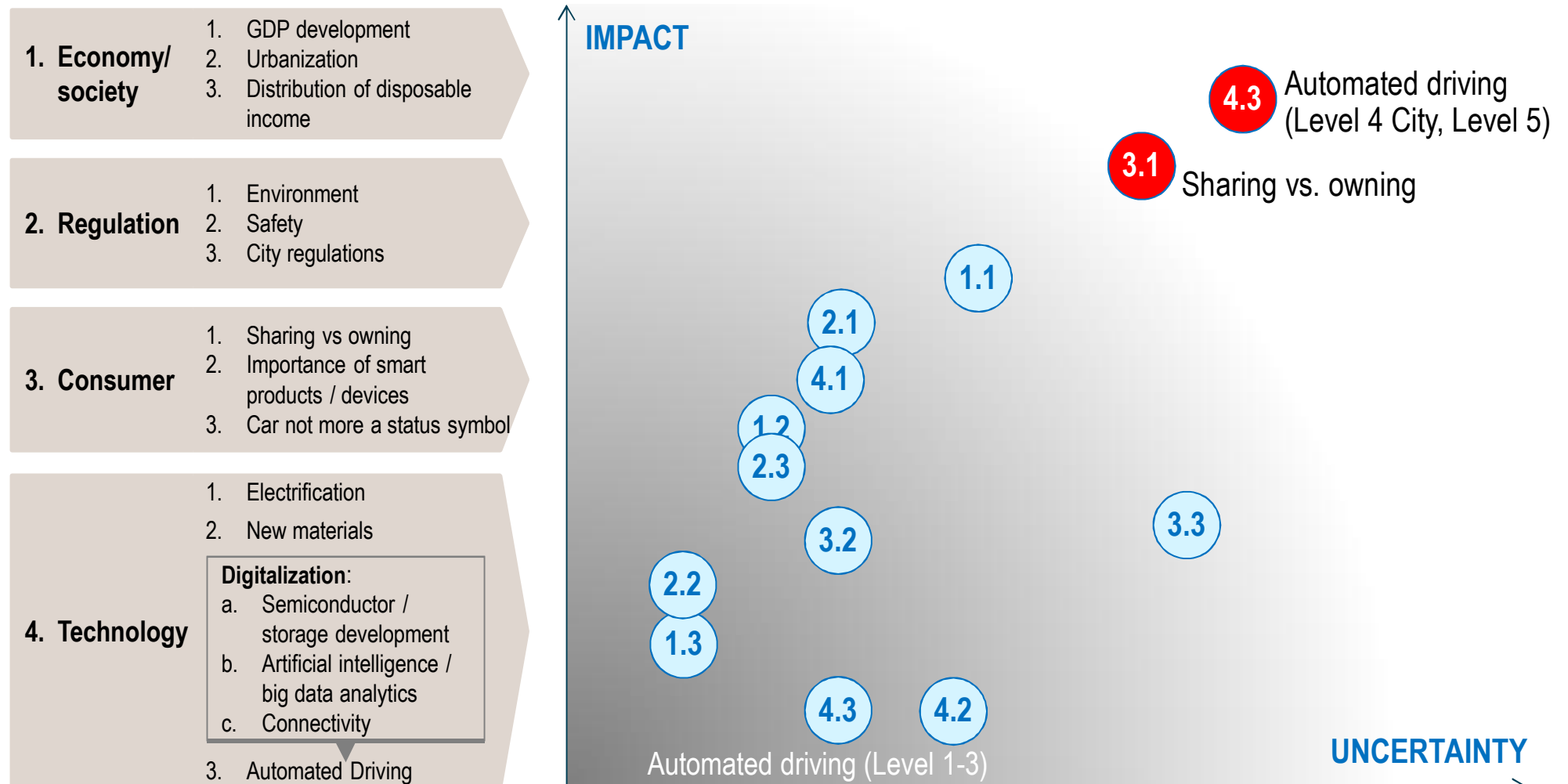


Wien, Nov. 16, 2015



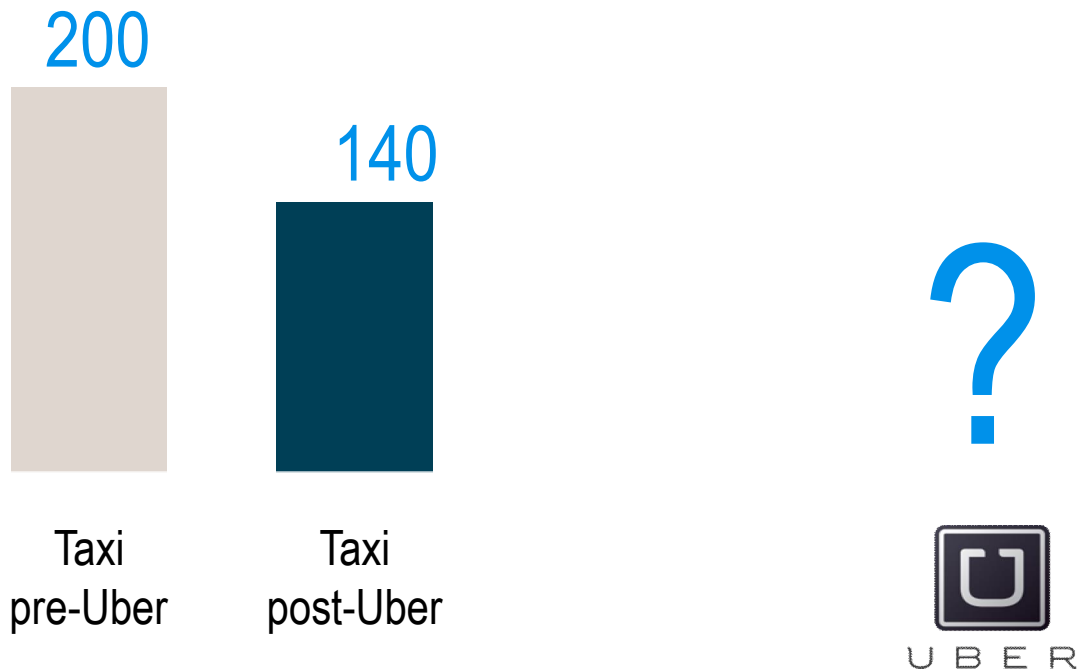
Four groups of influences impact the development of the industry – "Sharing vs. owning" and "Automated Driving" most disruptive

Key influencing factors and trends vary regarding impact and uncertainty



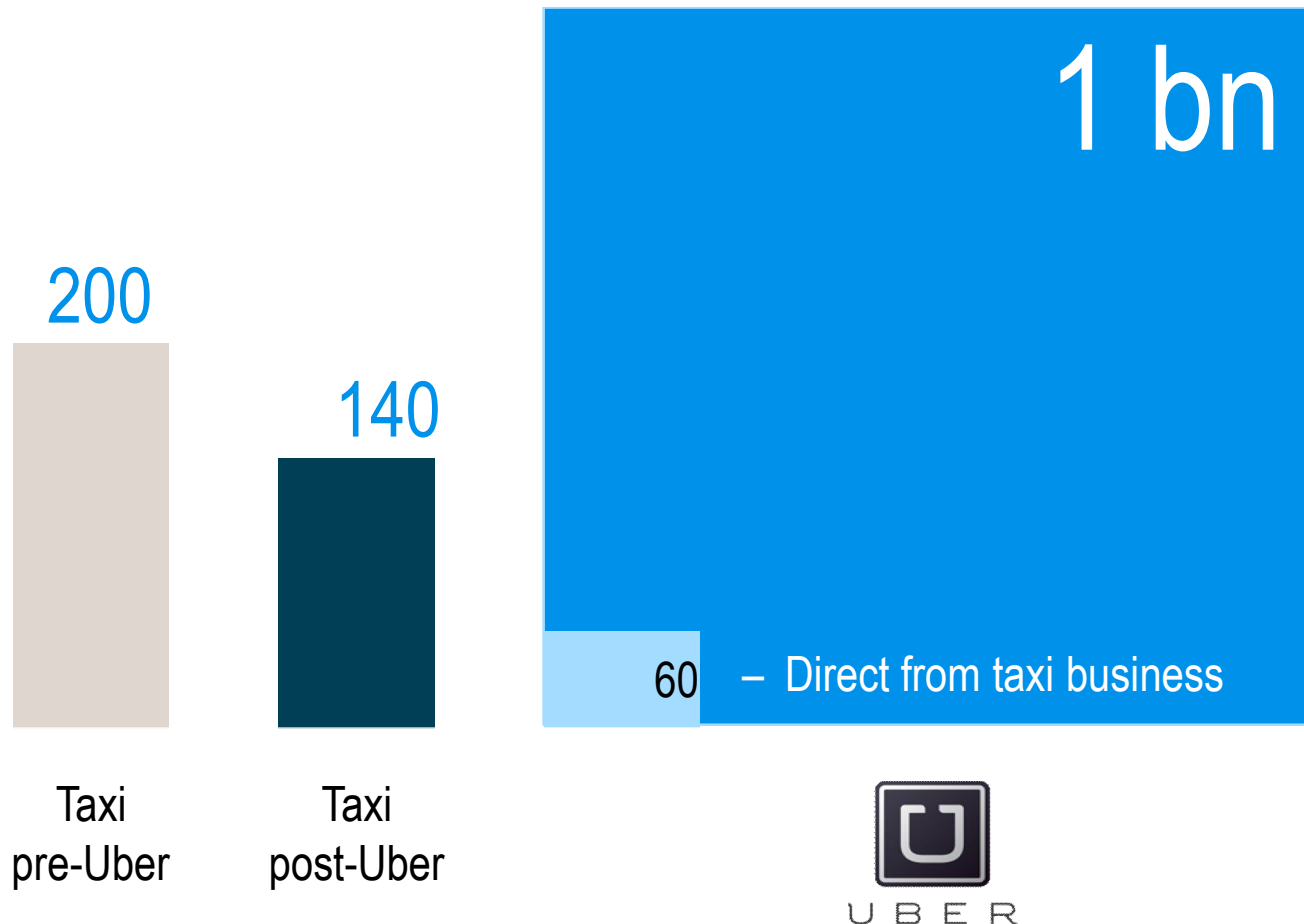
Disruption is already happening...

SFO metro area – Taxi market revenues p.a. [USD m]



Disruption is already happening... – and it is impacting players in the entire ecosystem

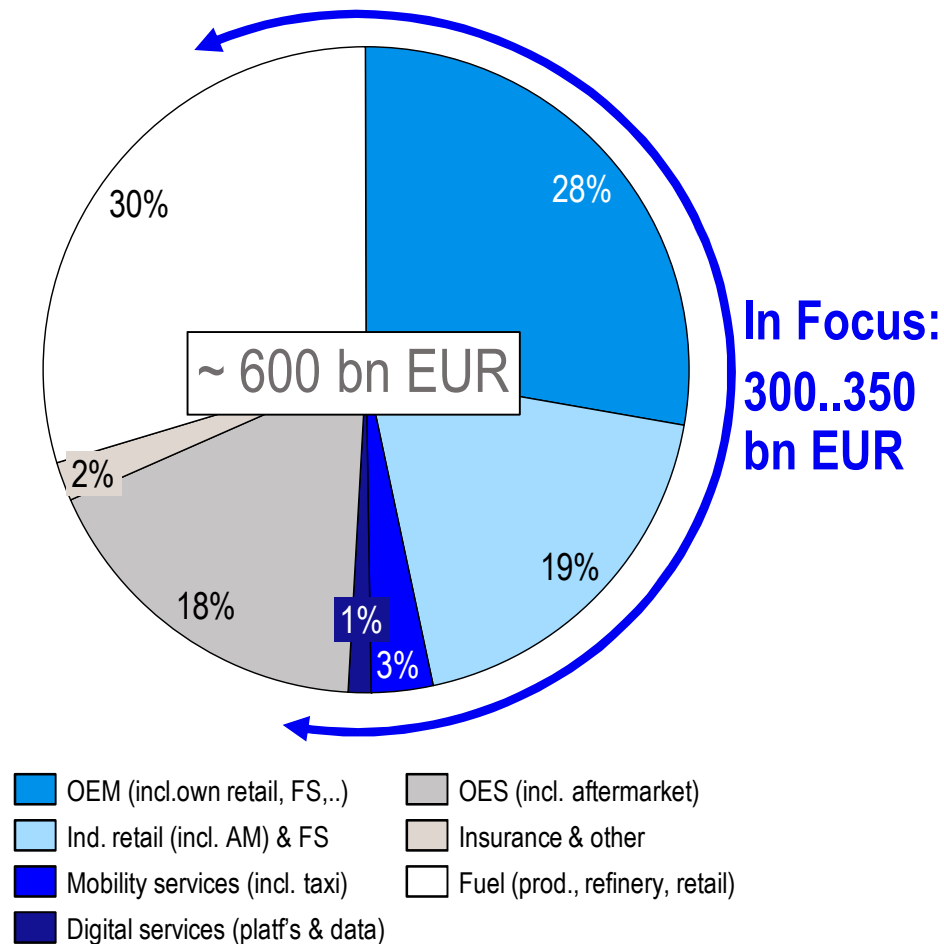
SFO metro area – Taxi market revenues p.a. [USD m]



- > Only 60 m from traditional taxi business
- > New market created – at the expense of all players

Financial markets expect tech companies to tap into new revenue and profit pools – Automotive mobility one of the largest globally

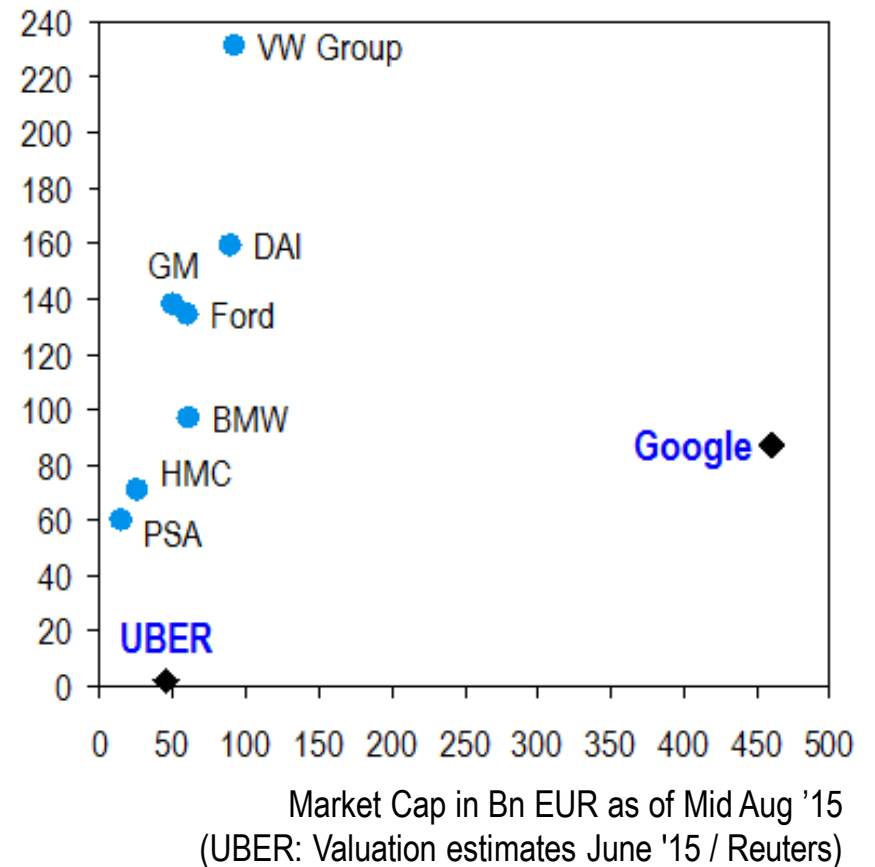
"Automotive mobility"-related global EBIT 2015e



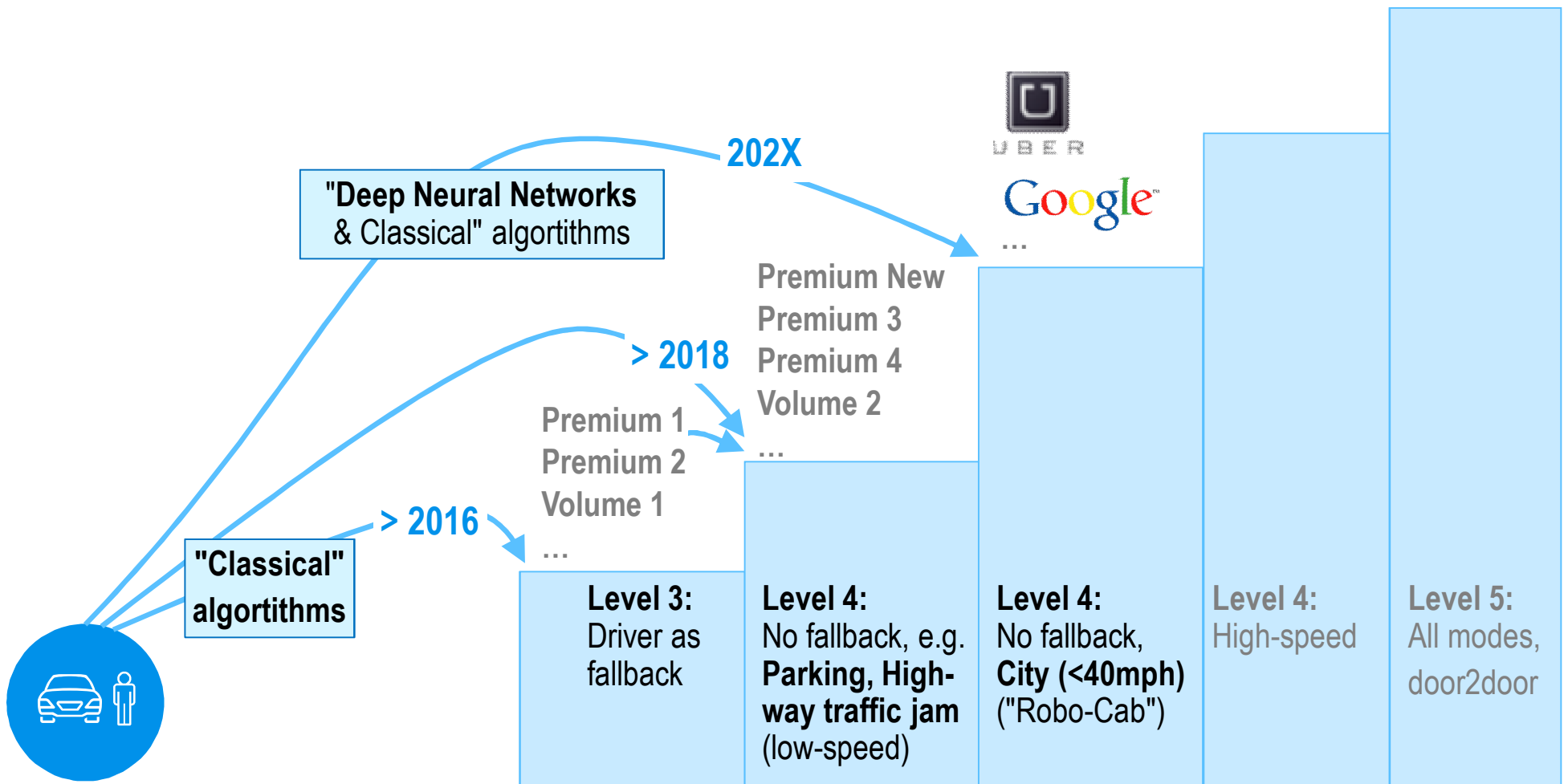
Revenues and valuation of key players

Revenues 2014

(UBER: Estimates 2015 / Reuters)

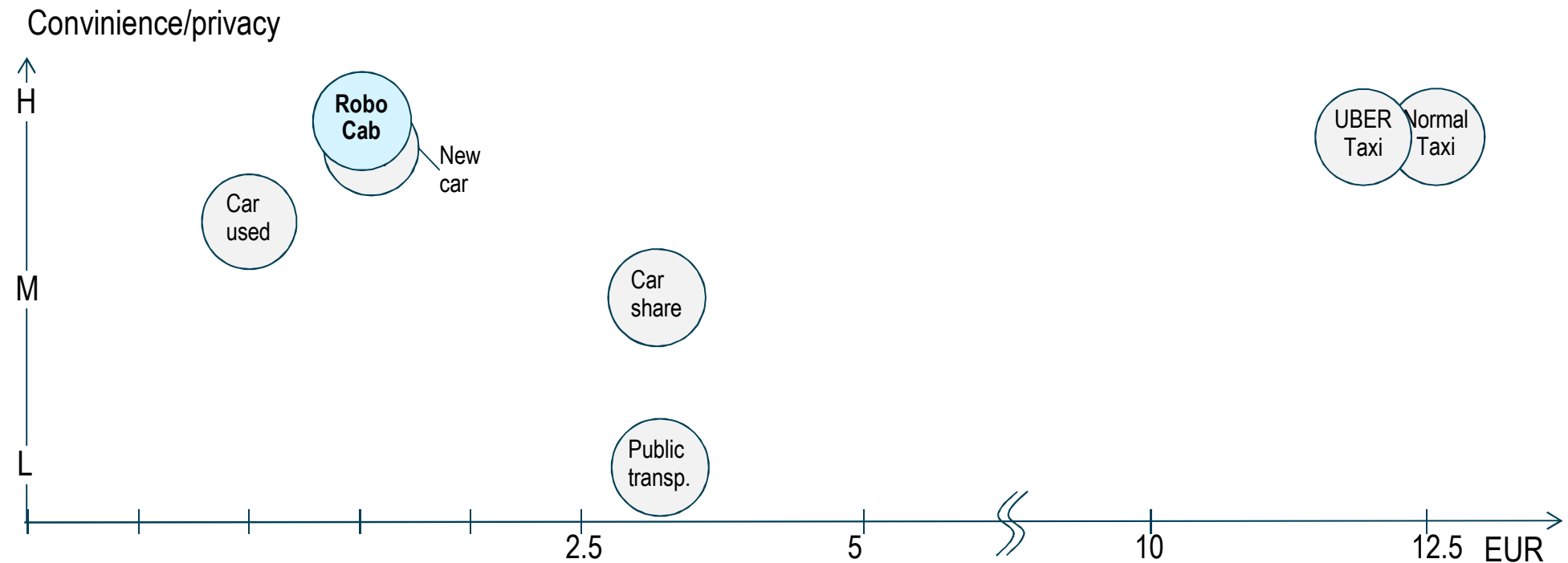


OEMs follow different pathways to automation – using AI-methods, Silicon Valley wants to disrupt the Automotive mobility industry



Convenience and relatively low transportation might lead to disruptive changes of mobility behavior in denser populated areas

Convenience and costs for 5 km travel in developed countries (Example Munich)



Taxi , UBER X costs: Example Munich, incl base fee + per km; 14 min driving time (finanztip.de)

Car Sharing: Example Munich – Car2Go; 14 min driving time

Car new: Private car, new, 4 years usage, 60,000 km total, Smart fortwo Coupe 1.0 (ADAC 5/2015)

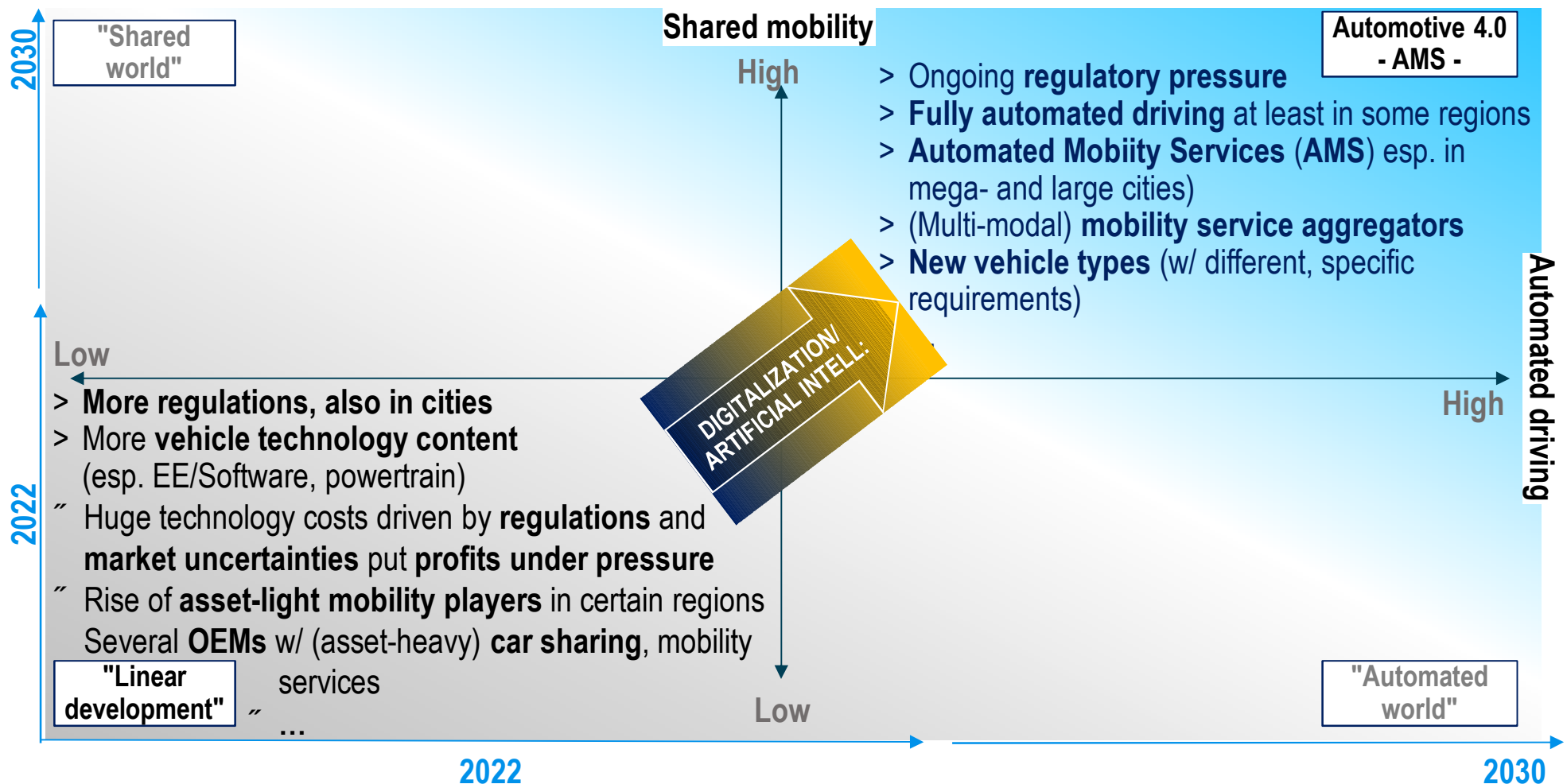
Car used: estimated 60% of new

Robo-Cab: Only 2 instead of 4 cars used per km², 80% higher mileage over usage period

Public transport: MVV, Preisrechner

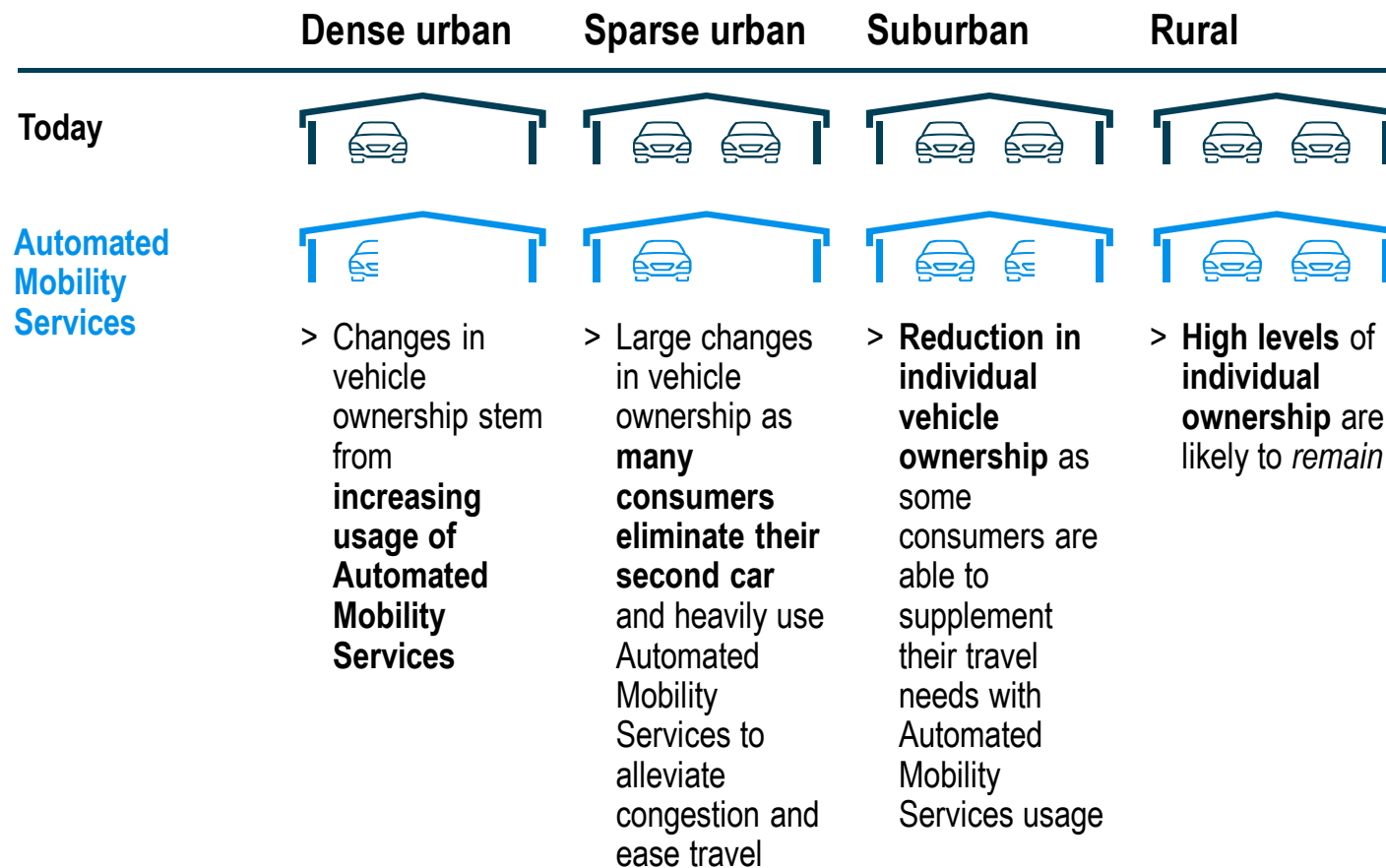
Until 2030, the Automotive ecosystem might see dramatic changes – outcome of endgame depends on mid-term actions of players

Mid- and long-term scenarios for the Automotive ecosystem



Automated Mobility Services (AMS) won't suddenly appear everywhere...

Vehicle usage in Automated Mobility Services for representative households in the US



Insights

- > **Developed vs. emerging markets:** Although we believe emerging markets will eventually migrate automated mobility services, this adoption process will be delayed compared to that of developed markets
- > **Population density:** The efficient usage of Automated Mobility Services can only be feasibly implemented in areas with high population density such as dense and sparse urban areas



Illustrative individually owned vehicles per household

Assuming Automated Mobility Services will become reality, certain key questions are on the minds of executives within the industry

Key questions on the Automotive 4.0 (Automated Mobility Services) industry

- 1 **How are the key industry metrics impacted: number of drivers, sales, vehicle parc and vehicle ownership?**

- 2 What will happen to today's vehicle portfolio?

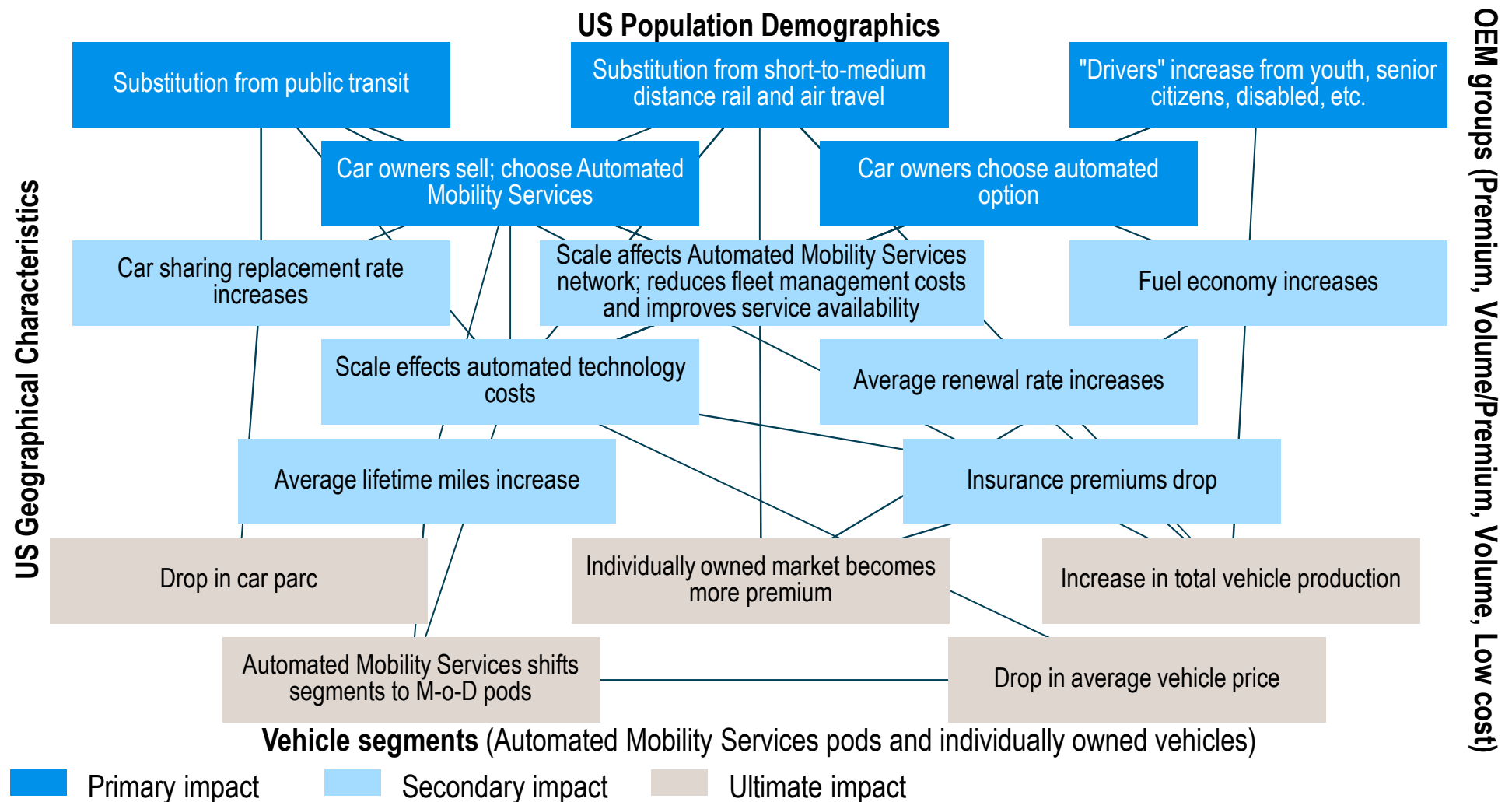
- 3 Where are the risks and **opportunities** across the value chain?

- 4 Who can win in the Automated Mobility Services space?

- 5 What are the **major implications for OEMs?**

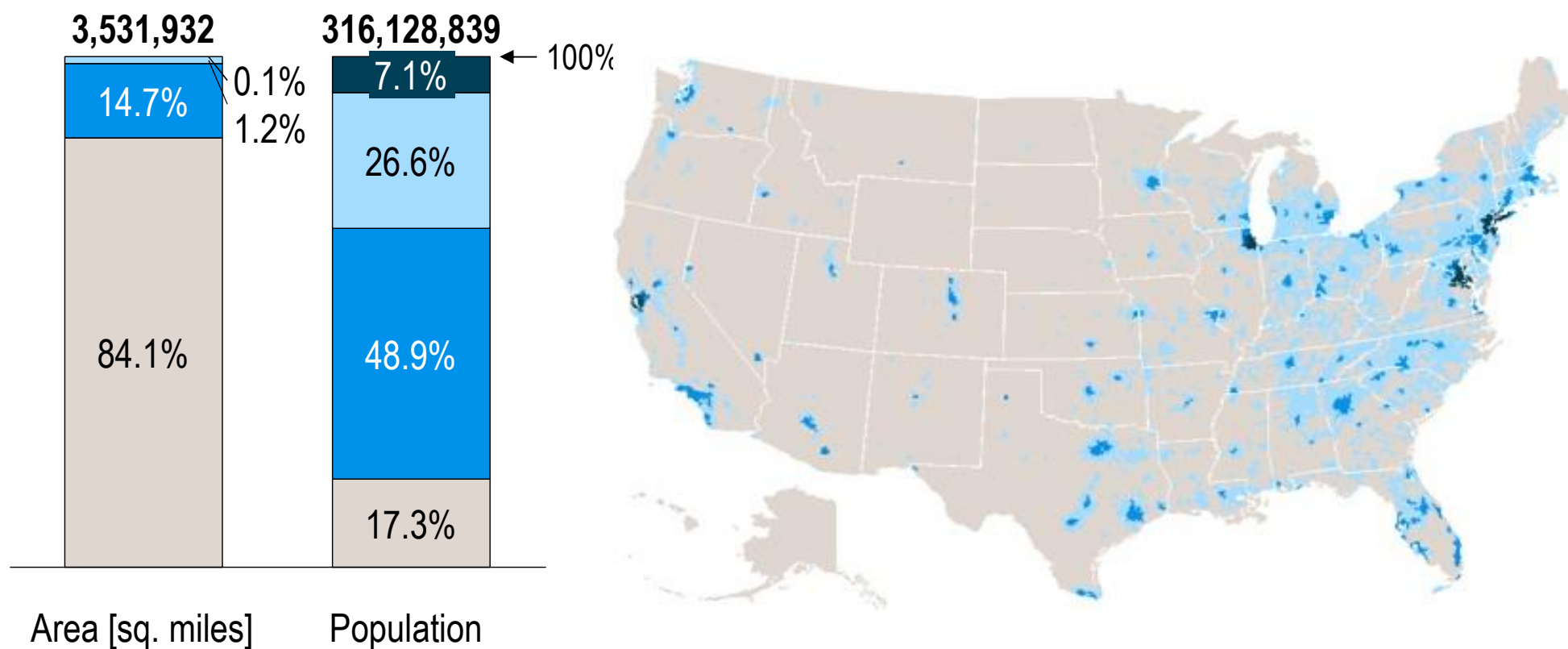
To answer these questions, we selected the US market as an example and built a market model to estimate the impacts

Calculating Automotive 4.0 (Automated Mobility Services)



More than a third of US inhabitants already live in dense and sparse urban environments

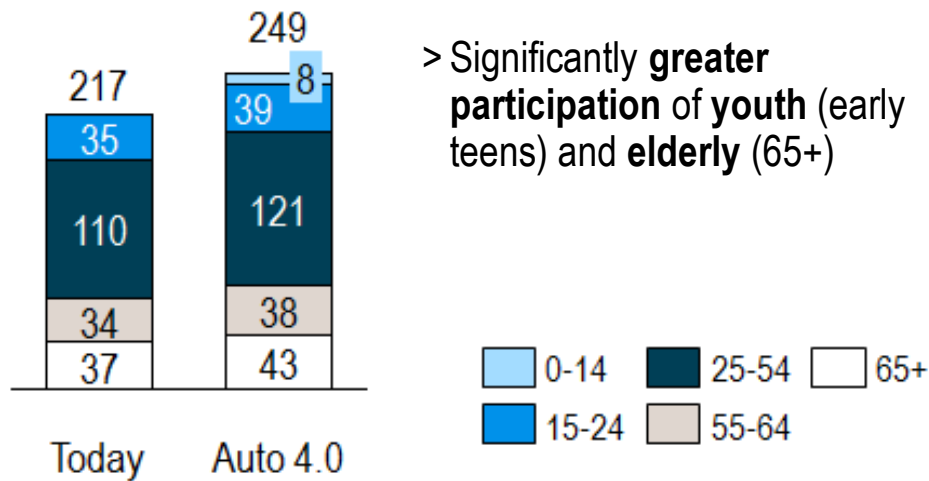
Classification of geographic regions in the US



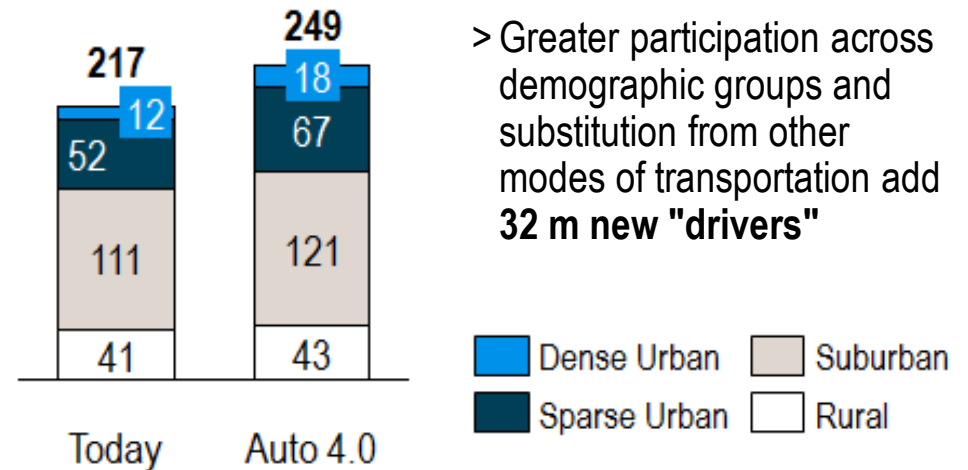
- Dense urban (>5,000) [people per sq. miles]
- Suburban (100-1,200) [people per sq. miles]
- Sparse urban (1,200-5,000) [people per sq. miles]
- Rural (0-100) [people per sq. miles]

More "drivers", significant lower car parc, limited impact on total sales figures, but significant less volume car sales

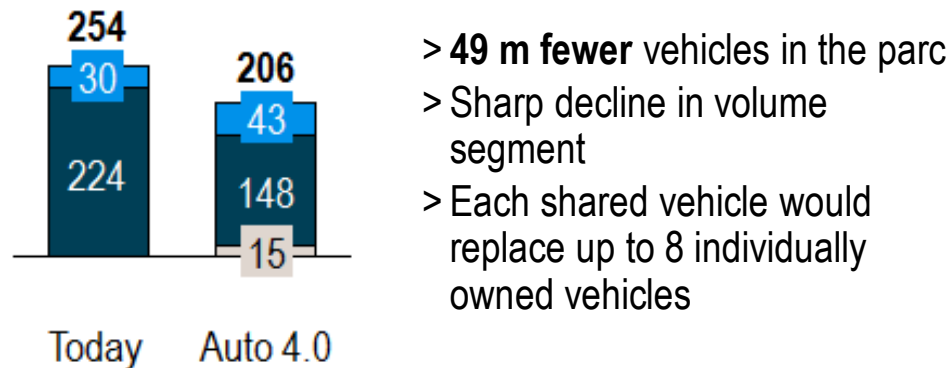
Total "drivers" in the US by age group [m]



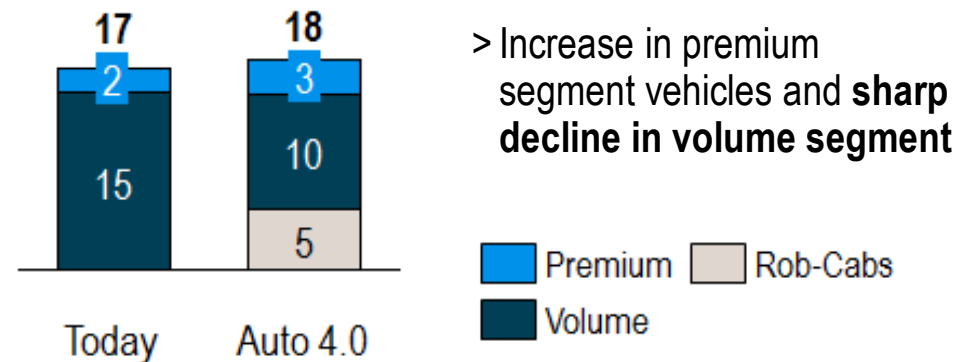
Total "drivers" in the US by region [m]



Vehicle parc in the US [m units]

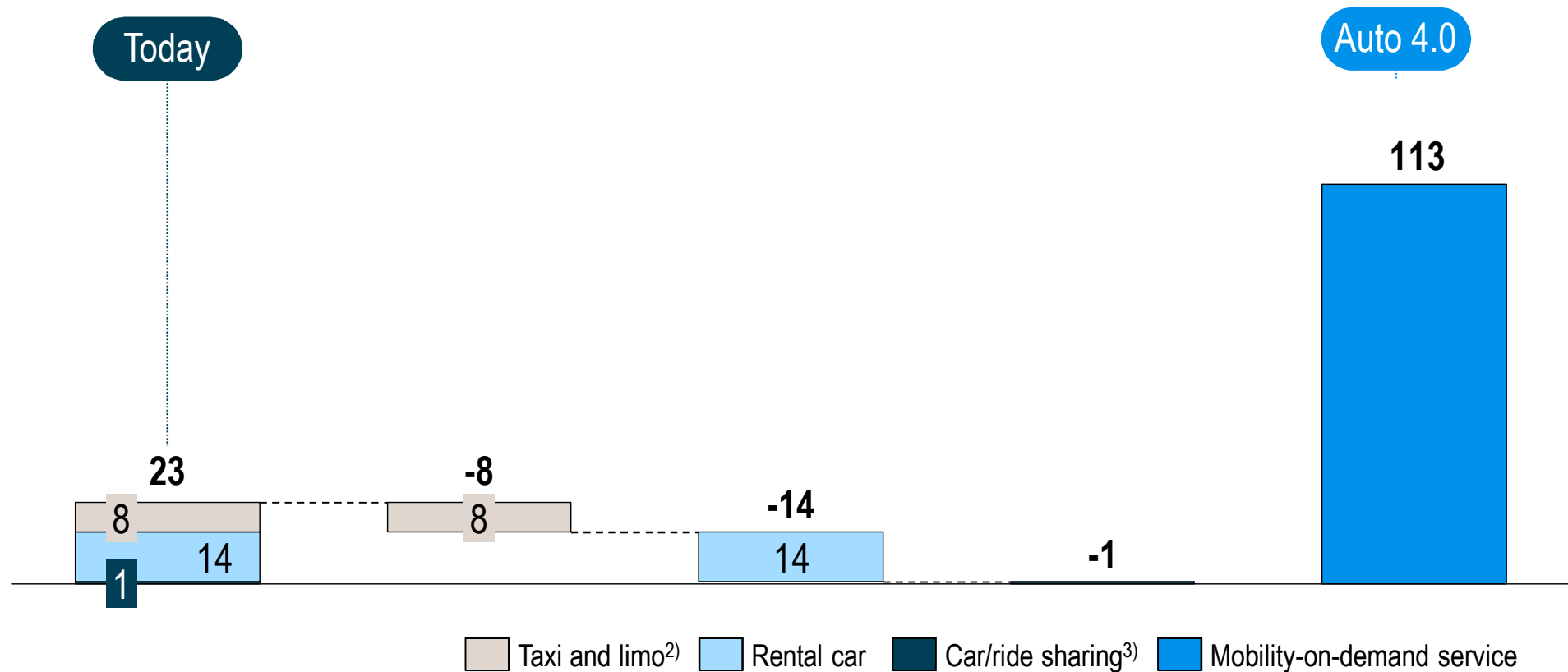


Annual sales volume in the US [m units]



Automated mobility will become a huge market, current mobility service solutions are mostly replaced

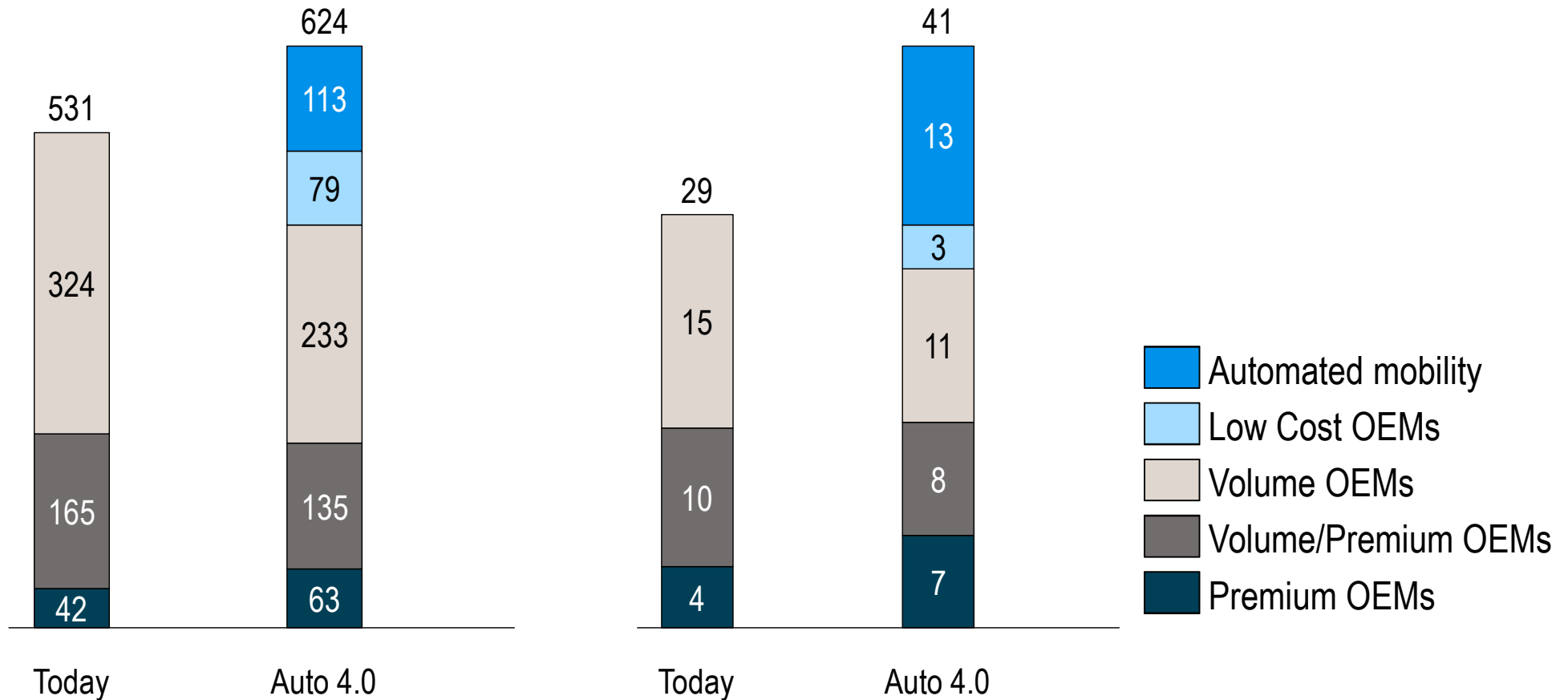
Value-add by elements of the US mobility market¹⁾ [USD bn]



1) Considers only value-add items; does not include fuel, depreciation, insurance, parking etc.; 2) Maintenance is not included; 3) Based on 2013 figures of Zipcar, Uber, Car2Go, DriveNow, Lyft, Sidecar, etc.

Significant drop of OEM revenue & profit pool (esp. in volume segment), automated mobility accounts for >30% of future profit pool

Annual US revenue and profit pools [USD bn]



The industry is facing the potentially most disruptive changes since more than 100 years.. – and need to act fast and bold now

AI-based methods such as Deep Learning (in which the "old industry" has very little experience) are **key to automate inner-city traffic** - **Disruptive industry changes** can be expected when that succeeds

Silicon Valley players use those since the 90`s or buy **respective know-how** – with a "Can-do"-**mindset**, tremendous **financial power** and a **software driven** approach they are **challenging** the incumbent Automotive industry in **creating new and innovative business models**

The advent of **Automated Mobility Services** will also result in a **dramatic change of the vehicle mix** – much less volume cars, more (automated) premium and budget type vehicles as automated pod's / Robo-cab's – putting **most OEM's current business models at stake**

At the same time, the OEMs financial situation most likely **will not get better** in the next 10 years...

To succeed in the race, **Automotive OEMs** should:

- “ **Radically rethink current value add / investment focus** and **dramatically improve efficiency** to be able to invest over the next years
- “ Explore new ways of getting **access to innovations** (technology, business models, ...)
- “ Start **experimenting** with **differentiating business models for mobility services**
- “ **Cooperate** in AI-based prediction methods and advanced architectures for Highly Automated Driving
- “ **Transform** from "steel and iron -" to "**software-companies**" rapidly (**culture/mind-set, processes**) and adopt their **organization** accordingly

If OEMs do loose the race, a significant part of their **profit pool** is moved towards "**Automated Mobility Services**", and **ultimately** the "old" industry is **marginalized**

Roland
Berger

